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Title: Generation IV Molten Salt Nuclear Reactors of the Future

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Generation IV Molten Salt Reactors of the Future

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Mentor: Dale T. Carver

Ignite-Off Presentation - 2021



Managed by Triad National Security, LLC, for the U.S. Department of Energy's NNSA.

7/14/2021

1



- 300x energy yield
- Clean
- Reliable
- Modular

Why is research into Molten Salts important?

- What are Gen IV reactors?
- What are moderators?
- How are the two related?



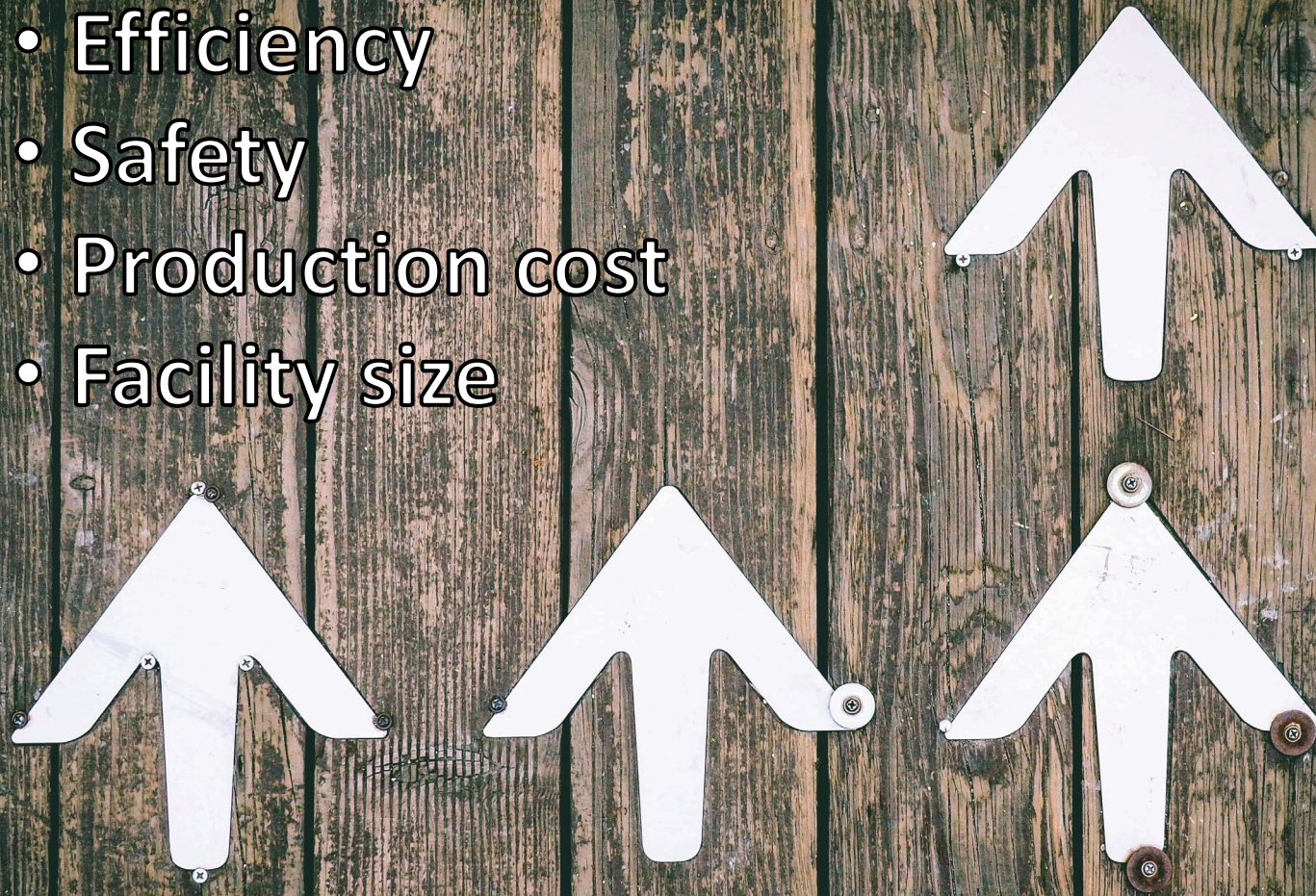






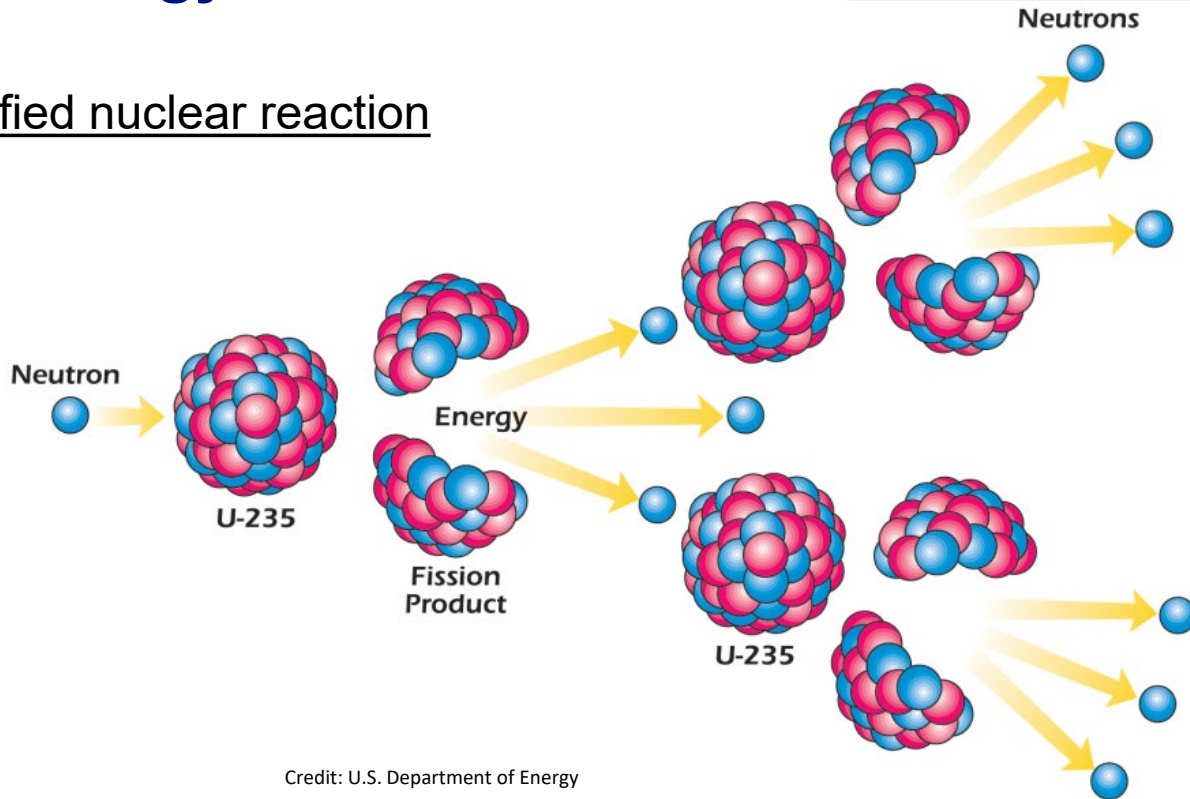
STAY SAFE

- Efficiency
- Safety
- Production cost
- Facility size

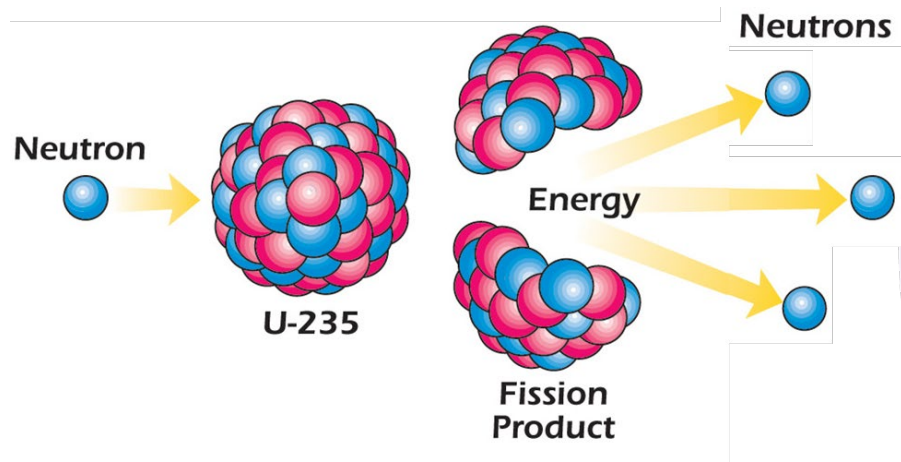


Moderators in Nuclear Energy Production

Simplified nuclear reaction



Generates energy primarily
in the form of heat

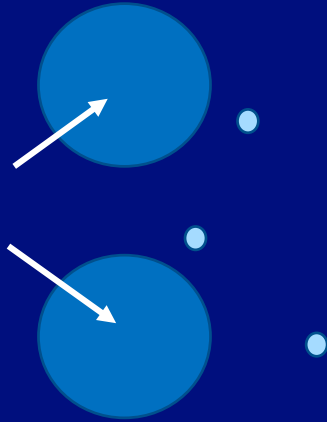


↓ Velocity \approx ↑ Likelihood of Fission





Nucleus split
emitting neutrons



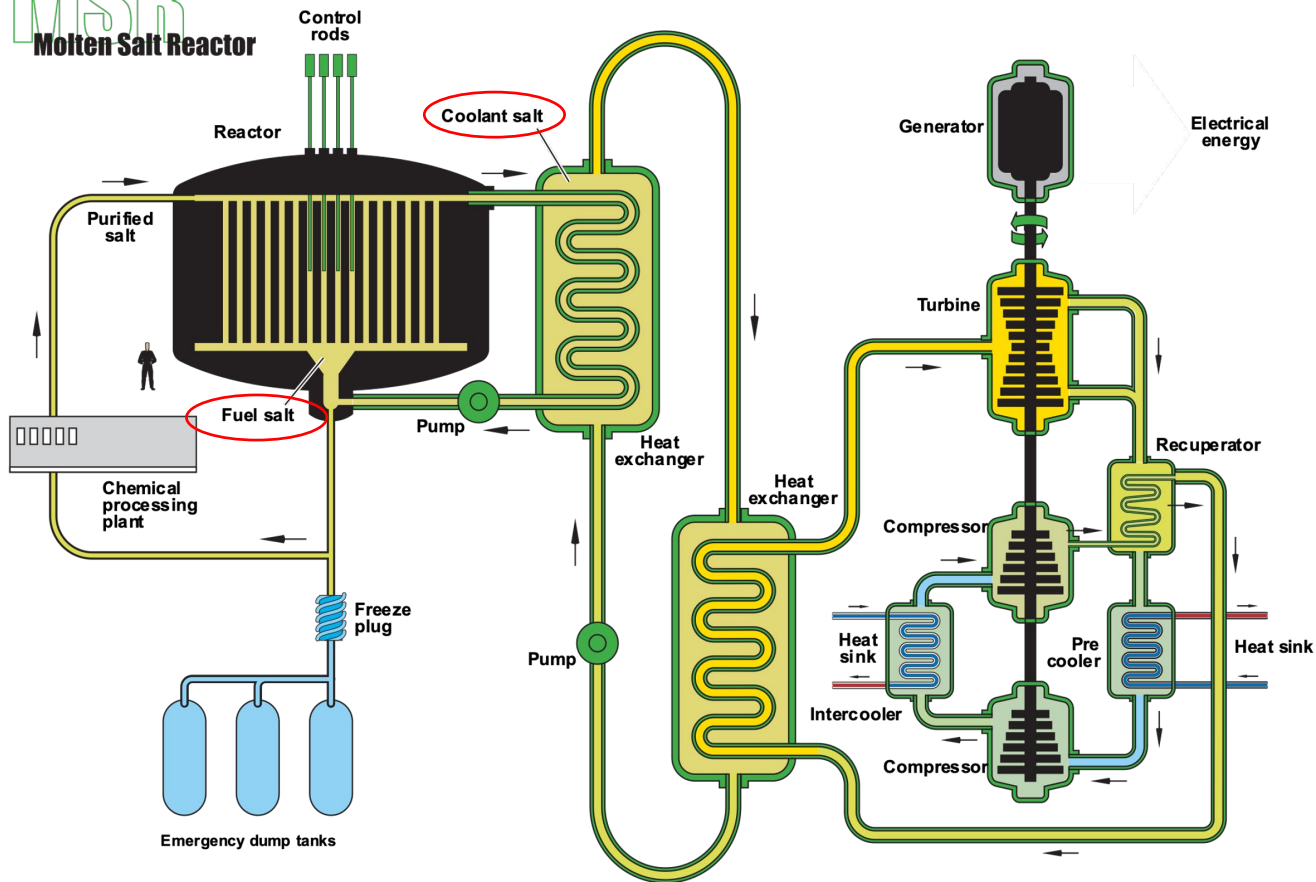
Moderator

Another Nucleus



MSR

Molten Salt Reactor

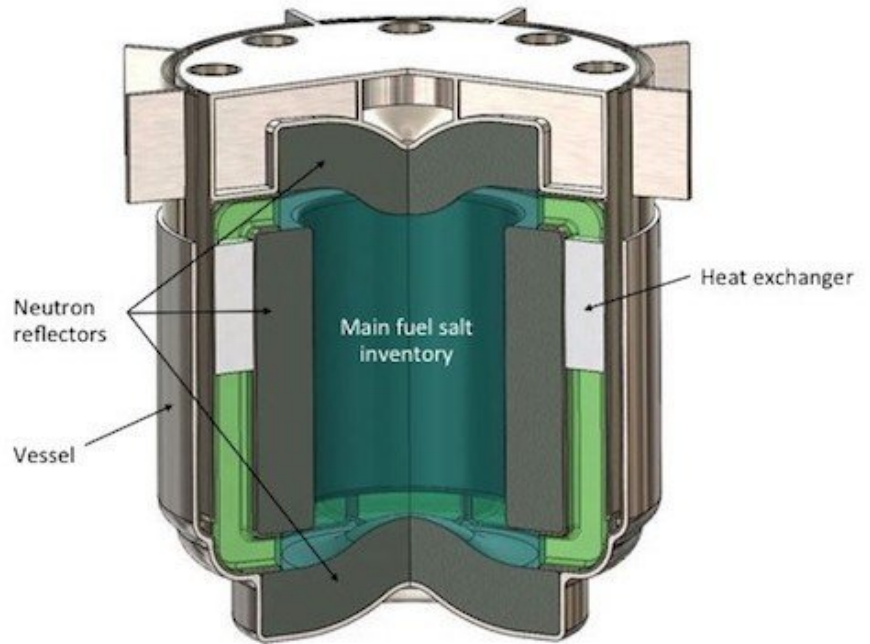






↑ Operating Temp. \approx ↑ Efficiency

↓ Operating Pressure \approx ↑ Safety



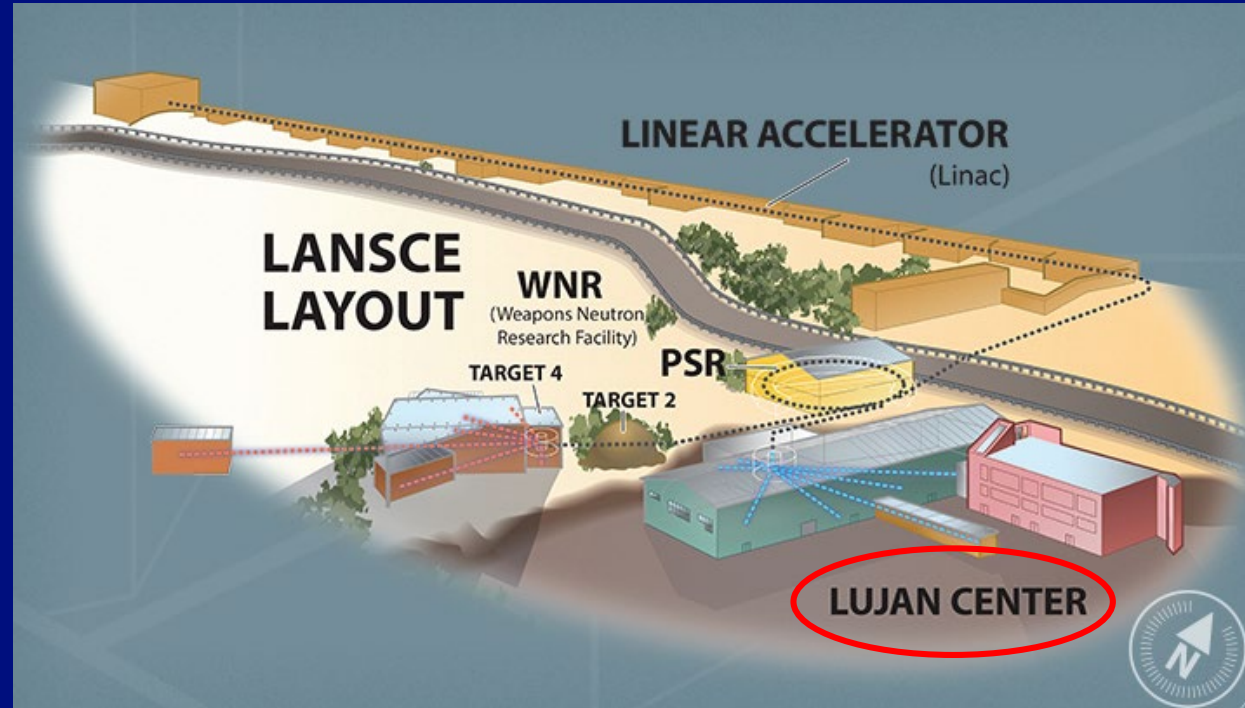
Credit: TerraPower



- $\pm 50\%$ uncertainty
- Work to improve precision

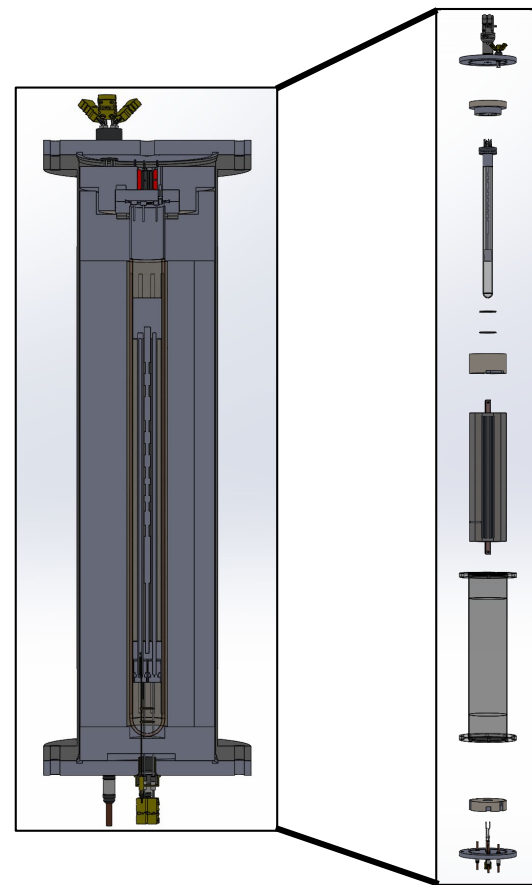


Precise properties to be
found via neutron
imaging at Lujan Center



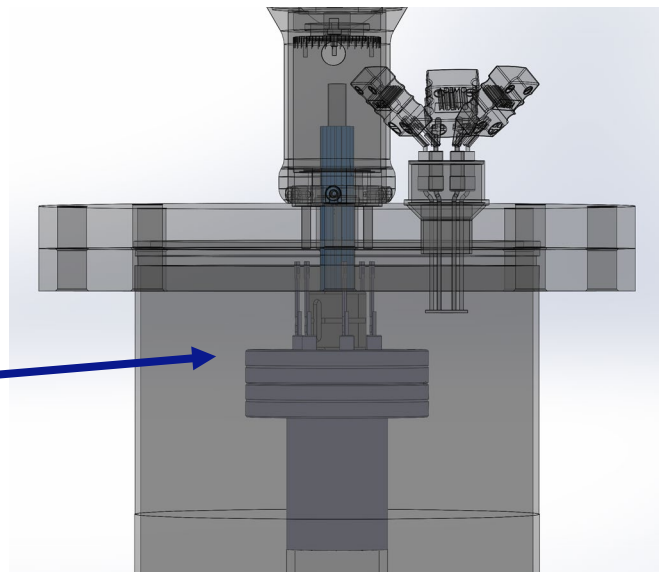
Custom Furnace to Hold Salts at Temperature

- Triple containment
- 1200° C
- Supports Neutron Imaging





Specialized
Rotary motor



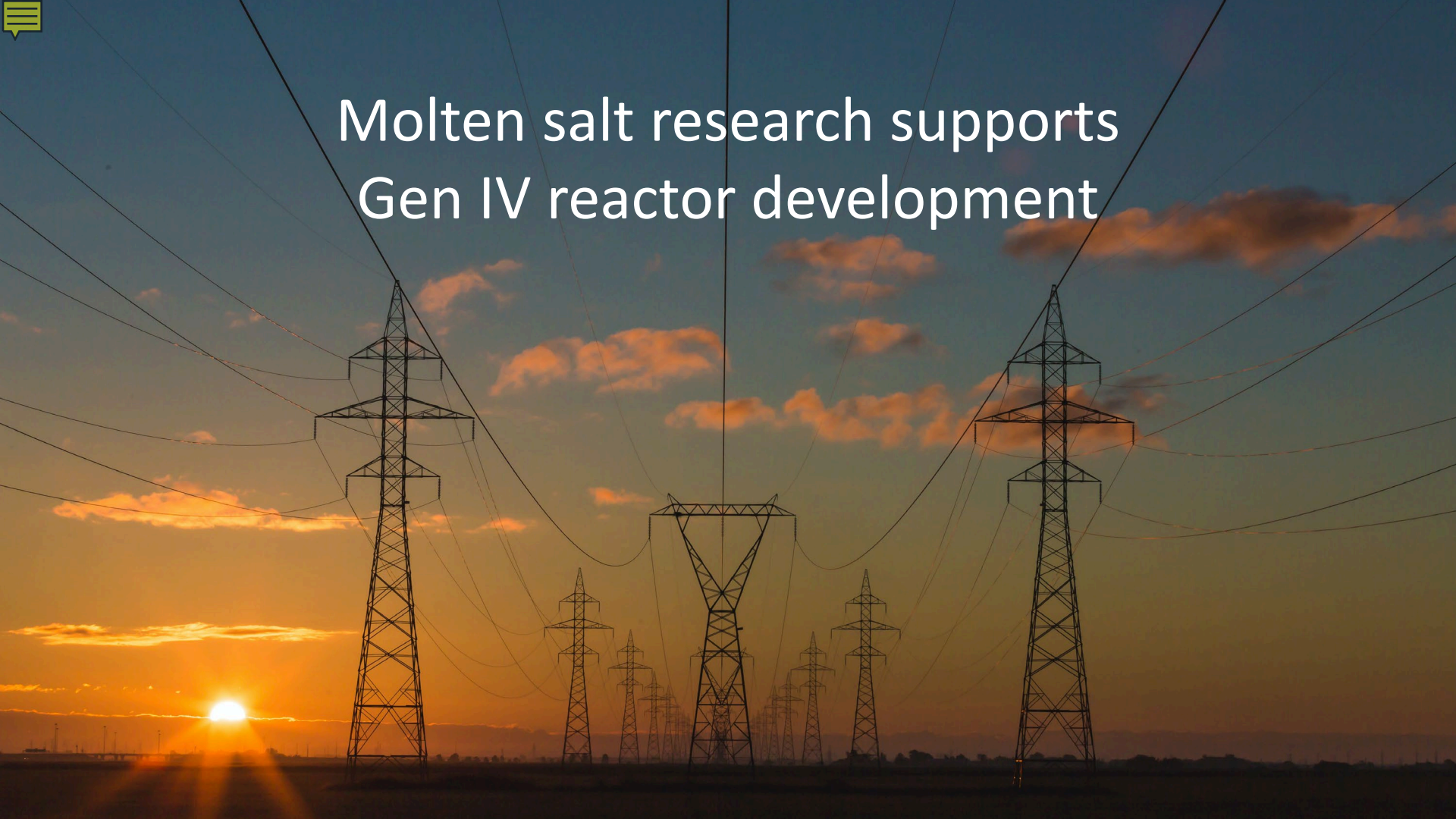
Coupler and
Low Friction
Supports

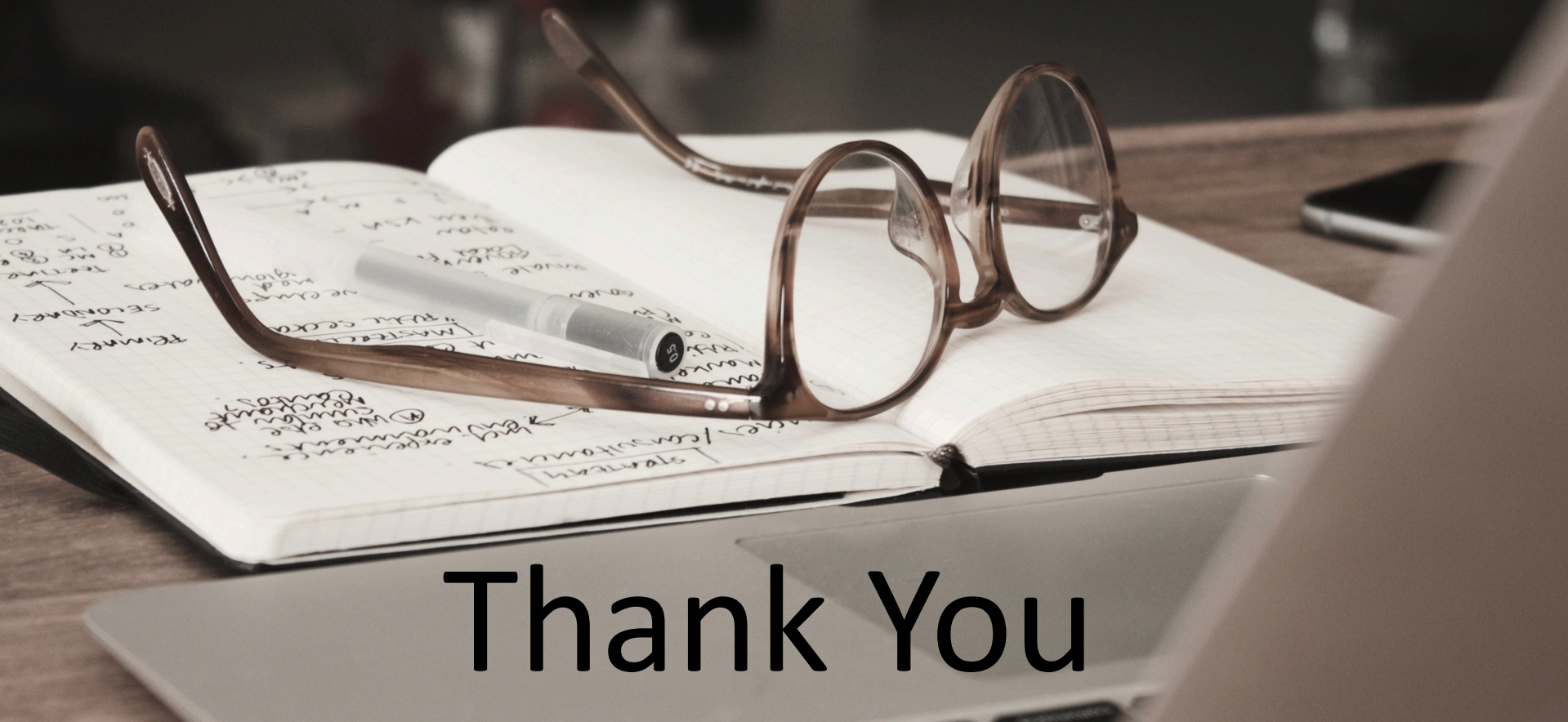


Sample
containment
replacement



Molten salt research supports Gen IV reactor development





Thank You